MULTIMEDIA UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2016/2017**

## TDB2121 – DATABASE DESIGN AND MANAGEMENT

( All sections / Groups )

7 OCTOBER 2016
9.00 a.m. – 11.00 a.m.
( 2 hours )

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**INSTRUCTIONS TO STUDENTS**

1. This question paper consists of **5 QUESTIONS** with **TWO** sections only.
2. Attempt all questions in **Section A** and attempt **TWO** out of **THREE** questions in **Section B**.
3. If you attempt all questions in Section B, only the first two questions are considered.
4. You are allowed to use calculators in this examination.
5. Please print all your answers in the Answer Booklet provided.

## SECTION A: Answer ALL (30 marks)

## QUESTION 1

Dr. Nadhan owns a clinic. Currently, records of patients are kept manually in filing cabinets in the store room. Recently, he has hired a trainee to create a database to store the patient records. These are the entities that have been identified by the trainee:

- Patient (**P_ID**, P_Name, P_Gender, P_Contact, P_Address)
- Appointment (**App_ID**, App_Date, App_Session, P_ID )
- Treatment (**TreatCode**, Treat_Details, Treat_Date, P_ID)
- TreatMed (**TreatCode, MedicineCode,** Treat_Price, Treat_Qty)
- Medicine (**Med_Code**, Med_Price, Med_Qty, Med_ExpiredDate)

(a) Assume that these tables have created: Patient, Appointment and Treatment and you are the trainee. Please develop the Medicine table using SQL command with the following conditions:

- Check the existence of medicine table.
- Medicine code is set as auto increase where the table starts with number 100.
- Med_Price must have default value 1.
- Have the constraint check where quantity of the medicine should not go below 15.
- Design the table with appropriate data types.

[5 marks]

(b) Although the Appointment table has been created, but the foreign key is yet to create. Solve the problem with this constraint: field cannot update when record is found in both parent and child tables but it will set to null if record in parent table is deleted.

[2.5 marks]

(c) Dr Nadhan wants to know the total price of medicine that was purchased by each patient from 1-1-16 to 31-12-16. The records must be sorted according to patient name in ascending order. Please help him. [Hint: grouping is needed]. [4 marks]

(d) A view must be developed for Treatment so that the nurse CANNOT see the treatment details. Make sure the record always sort according to date. [2 marks]

(e) The nurse will check the total number of patients that visited the clinic every day in summary at the end of month. Please solve the problem by writing the SQL command that produce such summary output for month June.
[Hint: you may want to use COUNT] [1.5 marks]

**Continued.....**

## QUESTION 2

House2U is a company that sells properties. These are the business processes where data marts are needed: property sales and property advertising. PropertySales will be used to support decisions related to: property sale price, commission and revenue from sales, peak sales during certain time period, and which branch has a good sale performance. PropertyAdvert will provide summary information such as suitable time to advertise, which newspaper, what properties are involved, any promotion, all branches are involved or only certain branches need advertisement. Below is the relational schema of House2U:

Newspaper (**NewsID**, NewsName, NewsType, Newsdate, Distribution, City, Region, Country) with 54 records.
Time (**TID**, TDay, TWeek, TMonth, TYear) with 365 records.
Property (**ProID**, ProType, Street, City, Postcode, Region, Country) with 3500 records.
Branch (**BranchID**, BranchType, City, Region, Country) with 5 records.
Promotion (**PromoID**, PromoName, PromoType) with 127 records.
Client (**ClientID**, ClientName, ClientType, City, Region, Country) with 753 records.
Owner (**OwnerID**, OwnerName, OwnerType, City, Region, Country) with 2135 records.
Staff (**StaffID**, StaffName, Position, Gender, City, Region, Country) with 382 records.

(a) Relate the dimension tables to each data mart and write down your answer. [3 marks]

(b) Based on your answer in a), design and illustrate a star schema for PropertyAdvert. [4 marks]

(c) Describe using figure how would you change the Star Schema of **Property** dimension into a Snowflake Schema. Justify your answer. [3 marks]

(d) Based on the star schema in b) and snowflake schema in c), which schema is better? Justify your answer. [2 marks]

(e) Estimate the number of rows and the size of field based on the schema you have designed in b). Assume that your fact table has 6 fields and each field has 4 bytes in length. [3 marks]

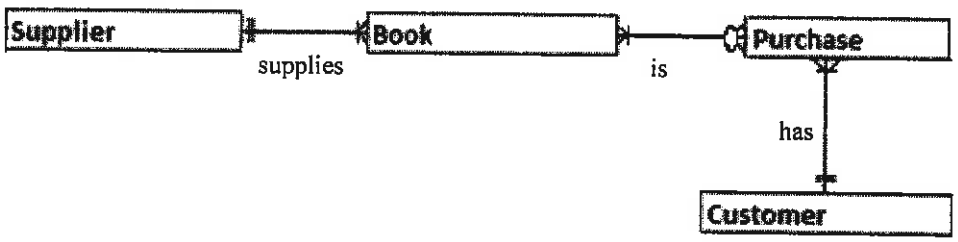
**Continued.....**

**SECTION B: Attempt TWO out of THREE questions (20 marks)**

**QUESTION 1**

(a) Based on Dr. Nadhan's scenario in **QUESTION 1**, now you are required to automate the quantity deduction after the medicine has sold out. Please apply trigger with SQL command where this trigger reduces medicine quantity when patients make a purchase. [4 marks]

(b) An Online Book Store wants to implement object oriented database model. Below is the initial Entity Relationship Diagram (ERD). Assume that you were the database administrator. You had to transform the following ERD to Unified Modeling Language (UML) Diagram. For each entity, you must identify **TWO** related attributes. Please illustrate the UML diagram with all the necessary components. [6 marks]

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## QUESTION 2

(a) TravelEverywhere is a travel company. It has few branches in China, Japan, Malaysia and the main branch is in Taiwan. It offers customers with various kinds of travel packages that range from normal affordable to luxury price range. It has a centralized database, whenever customers make requests, they need to call or write to the main branch in Taiwan. The company is considering whether to implement distributed database management system (DDBMS). Assume that you have been hired as the Chief Technology Officer (CTO) of the company, and you have good experience in database,

(i) How will you persuade the company to implement DDBMS? Please justify with 5 reasons. [2.5 marks]

(ii) Based on the transparency that you suggest above, how will the SQL command look like if the main branch wants to retrieve customer with the first name start with 'M'? Assume that Customer table has CusID, fName, lName, CusContact, CusAddress, CusRegion, CusEmail and CusCountry. Please sort the records according to first name. [1.5 marks]

(iii) TravelEverywhere has Staff table with these fields: StaffID, StaffName, PayGrade, StaffPosition, StaffIC, StaffEmail, and StaffContact. Payroll Department will vertically fragment the fields. In your opinion, which fields should be chosen? [1 mark]

(b) Assume that you were a database administrator (DBA) of a company. The top management has decided to transfer all the data in spreadsheet to database. You will be the project leader who is involved in the transformation process.

(i) How can you help in carrying out the technical role as a DBA? [4 marks]

(ii) How will you enhance the security controls of database? Please provide **TWO** methods. [1 mark]

**Continued.....**

## QUESTION 3

Assume that you have the following tables.

**SalesAgent**

| SalesID | SalesName | Salary | BranchNo |
|---|---|---|---|
| SL21 | John White | 4500 | B003 |
| SL37 | Goh Hui Ann | 3500 | B002 |
| SL14 | David Forn | 3500 | B002 |

**Branch**

| BranchNo | Street | City | PostCode |
|---|---|---|---|
| B001 | Jln. Laksamana | Melaka | 75250 |
| B002 | Jln. Raja Chulan | Kuala Lumpur | 78000 |
| B003 | Jln. Damai | Kuantan | 76600 |

(a) Create *BranchList.xml* document based on table Branch. [4 marks]

(b) Describe the XML document in a) with appropriate Data Type Definitions (DTDs). [3 marks]

(c) You may have used some of the repetition options in your DTDs. Please explain at least TWO repetition options with example that relate to the tables given. [3 marks]

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